

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please AMEND claims 1-3, 6-7, 9-10, 13, 15, 17-18, 21, 22, 24-25, 28, 30-31, and 37, in accordance with the following:

1. (CURRENTLY AMENDED) A flash memory, comprising:

a first boot zone storing a first booting program;

a second boot zone storing a duplicate of the first booting program, as a second booting program; and

a data zone storing an executable firmware program executable and accessible based on selectable booting of the first or second booting programs when executed after execution of the first or second booting programs such that execution of the first booting program is selectively commenced by a controller based on error detection results of the first boot zone and such that execution of the second booting program is selectively commenced by the controller based upon an error being detected in the first boot zone and on error detection results of the second boot zone,

wherein the flash memory is operable after the selectable booting of the first and second booting programs and upon execution of the firmware program.

2. (CURRENTLY AMENDED) A memory protection apparatus, of an AT Attachment Packet Interface (ATAPI) drive for storing an executable firmware program, downloaded from a host, the apparatus comprising:

a storage unit having a first boot zone storing a first booting program, a second boot zone storing a duplicate of the first booting program, as a second booting program, and a data zone storing the firmware program; and

a controller checking for a presence of an error in the first and/or second booting zones when the ATAPI drive is initialized, commencing execution of the first booting program based on error detection results of the first boot zone, commencing execution of the second booting program based upon an error being detected in the first boot zone and on error detection results of the second boot zone, and controlling execution of the firmware program,

wherein the ATAPI drive is operable after selectable booting of the first and second booting programs and upon execution of the firmware program.

3. (CURRENTLY AMENDED) A memory protection apparatus, of an AT Attachment Packet Interface (ATAPI) drive for storing an executable firmware program, downloaded from a host, the apparatus comprising:

a storage unit having a first boot zone storing a first booting program, a second boot zone storing a duplicate of the first booting program, as a second booting program, and a data zone storing the firmware program; and

a controller checking for a presence of an error in the first and/or second booting zones when the ATAPI drive is initialized, commencing execution of the first booting program based on error detection results of the first boot zone, commencing execution of the second booting program based upon an error being detected in the first boot zone and on error detection results of the second boot zone, and controlling execution of the firmware program~~The apparatus of claim 2,~~

wherein the controller detects and corrects for an error in the second boot zone while executing the first booting program, when no error is detected in the first boot zone.

4. (PREVIOUSLY PRESENTED) A memory protection apparatus, of an AT Attachment Packet Interface (ATAPI) drive for storing an executable firmware program, downloaded from a host, the apparatus comprising:

a storage unit having a first boot zone storing a first booting program, a second boot zone storing a duplicate of the first booting program, as a second booting program, and a data zone storing the firmware program; and

a controller checking for a presence of an error in the first and/or second booting zones when the ATAPI drive is initialized, commencing execution of the first booting program based on error detection results of the first boot zone, commencing execution of the second booting program based upon an error being detected in the first boot zone and on error detection results of the second boot zone, and controlling execution of the firmware program,

wherein the controller detects and corrects for an error in the second boot zone while executing the first booting program, when no error is detected in the first boot zone, and

wherein data stored in the first boot zone, which has no error, is used as a basis for the detection and correction of the error in the second boot zone.

5. (ORIGINAL) The apparatus of claim 2, wherein the controller corrects for an error in the first boot zone while executing the second booting program, when the error is detected in the first boot zone.

6. (CURRENTLY AMENDED) A memory protection apparatus, of an AT Attachment Packet Interface (ATAPI) drive for storing an executable firmware program, downloaded from a host, the apparatus comprising:

a storage unit having a first boot zone storing a first booting program, a second boot zone storing a duplicate of the first booting program, as a second booting program, and a data zone storing the firmware program; and

a controller checking for a presence of an error in the first and/or second booting zones when the ATAPI drive is initialized, commencing execution of the first booting program based on error detection results of the first boot zone, commencing execution of the second booting program based upon an error being detected in the first boot zone and on error detection results of the second boot zone, and controlling execution of the firmware program~~The apparatus of claim 5,~~

wherein the controller corrects for an error in the first boot zone while executing the second booting program, when the error is detected in the first boot zone, and

wherein data in the second boot zone, which has no error, is used as a basis for the correction of the error in the first boot zone.

7. (CURRENTLY AMENDED) A memory protection apparatus, of an AT Attachment Packet Interface (ATAPI) drive for storing an executable firmware program, downloaded from a host, the apparatus comprising:

a storage unit having a first boot zone storing a first booting program, a second boot zone storing a duplicate of the first booting program, as a second booting program, and a data zone storing the firmware program; and

a controller checking for a presence of an error in the first and/or second booting zones when the ATAPI drive is initialized, commencing execution of the first booting program based on error detection results of the first boot zone, commencing execution of the second booting program based upon an error being detected in the first boot zone and on error detection results of the second boot zone, and controlling execution of the firmware program,

wherein the controller further comprises a switching unit switching the second boot zone on, so as to jump to the second boot zone during the initialization of the ATAPI drive to execute

the second booting program,

wherein the ATAPI drive is operable after selectable booting of the first and second booting programs and upon execution of the firmware program.

8. (ORIGINAL) The apparatus of claim 2, wherein the host is a computer and the ATAPI drive and the computer communicate using an ATAPI protocol.

9. (CURRENTLY AMENDED) A method of operating an ATAPI drive for storing an executable firmware program downloaded from a host, the method comprising:

detecting for an error in a first boot zone of a memory, storing a first booting program, and a second boot zone of the memory, storing a duplicate of the first booting program, as a second booting program, when the ATAPI drive is initialized;

commencing executing of the first booting programs based on error detection results of the first boot zone;

commencing executing of the second booting programs based upon an error being detected in the first boot zone and on error detection results of the second boot zone; and

accessing the data zone of the memory in which the firmware program is stored and executing the firmware program after the executed first or second booting programs,

wherein the ATAPI drive is operable after selectable booting of the first and second booting programs and upon execution of the firmware program.

10. (CURRENTLY AMENDED) A method of operating an ATAPI drive for storing an executable firmware program downloaded from a host, the method comprising:

detecting for an error in a first boot zone of a memory, storing a first booting program, and a second boot zone of the memory, storing a duplicate of the first booting program, as a second booting program, when the ATAPI drive is initialized;

commencing executing of the first booting programs based on error detection results of the first boot zone;

commencing executing of the second booting programs based upon an error being detected in the first boot zone and on error detection results of the second boot zone; and

accessing the data zone of the memory in which the firmware program is stored and executing the firmware program after the executed first or second booting programs
The method of claim 9,

wherein during the executing of the first booting program, an error in the second boot

zone is corrected for, while executing the first booting program in the first boot zone, which has no error.

11. (PREVIOUSLY PRESENTED) A method of operating an ATAPI drive for storing an executable firmware program downloaded from a host, the method comprising:

detecting for an error in a first boot zone of a memory, storing a first booting program, and a second boot zone of the memory, storing a duplicate of the first booting program, as a second booting program, when the ATAPI drive is initialized;

executing one of the first and second booting programs based on whether the first boot zone or the second boot zone includes an error; and

accessing the data zone of the memory in which the firmware program is stored and executing the firmware program after the executed one booting program,

wherein during the executing of the one booting program, an error in the second boot zone is corrected for, while executing the first booting program in the first boot zone, which has no error, and

wherein data in the first boot zone, which has no error, is used as a basis for the detection and correction of the error in the second boot zone.

12. (PREVIOUSLY PRESENTED) The method of claim 9, during the executing of the second booting program, an error in the first boot zone is corrected for, while executing the second booting program in the second boot zone, which has no error.

13. (CURRENTLY AMENDED) A method of operating an ATAPI drive for storing an executable firmware program downloaded from a host, the method comprising:

detecting for an error in a first boot zone of a memory, storing a first booting program, and a second boot zone of the memory, storing a duplicate of the first booting program, as a second booting program, when the ATAPI drive is initialized;

commencing executing of the first booting programs based on error detection results of the first boot zone;

commencing executing of the second booting programs based upon an error being detected in the first boot zone and on error detection results of the second boot zone; and

accessing the data zone of the memory in which the firmware program is stored and executing the firmware program after the executed first or second booting programs
The method of claim 12,

wherein, during the executing of the second booting program, an error in the first boot zone is corrected for, while executing the second booting program in the second boot zone, which has no error, and

wherein data in the second boot zone, which has no error is used as a basis for the detection and correction of the error in the first boot zone.

14. (ORIGINAL) The method of claim 9, further comprising communicating between the host, which is a computer, and the ATAPI drive using an ATAPI protocol.

15. (CURRENTLY AMENDED) A flash memory, comprising:

a first memory having a first boot zone storing a first booting program and a second boot zone storing a duplicate of the first booting program, as a second booting program; and

a second memory having a data zone storing an executable downloaded firmware program executable and accessible based on selectable booting of the first or second booting programs when executed after execution of the first or second booting programs, such that execution of the first booting program is selectively commenced by a controller based on error detection results of the first boot zone and such that execution of the second booting program is selectively commenced by the controller based upon an error being detected in the first boot zone and on error detection results of the second boot zone,

wherein the flash memory is operable after selectable booting of the first and second booting programs and upon execution of the firmware program.

16. (ORIGINAL) The flash memory of claim 15, wherein the firmware program is downloadable from a computer using an ATAPI protocol.

17. (CURRENTLY AMENDED) A memory protection apparatus, including an ATAPI drive for storing an executable firmware program downloaded from a host, the apparatus comprising:

a first storage unit having a first boot zone storing a first booting program and a second boot zone storing a duplicate of the first booting program, as a second booting program;

a second storage unit storing the firmware program; and

a controller detecting for an error in one of the first and second boot zones when the ATAPI drive is initialized, commencing execution of the first booting program or the second booting program, respectively, based on respective error detection results of the first and second boot zones, and controlling execution of the firmware program stored in the data zone of the

second storage unit,

wherein the ATAPI drive is operable after selectable booting of the first and second booting programs and upon execution of the firmware program.

18. (CURRENTLY AMENDED) A memory protection apparatus, including an ATAPI drive for storing an executable firmware program downloaded from a host, the apparatus comprising:

a first storage unit having a first boot zone storing a first booting program and a second boot zone storing a duplicate of the first booting program, as a second booting program;

a second storage unit storing the firmware program; and

a controller detecting for an error in one of the first and second boot zones when the ATAPI drive is initialized, commencing execution of the first booting program or the second booting program, respectively, based on respective error detection results of the first and second boot zones, and controlling execution of the firmware program stored in the data zone of the second storage unit
The apparatus of claim 17,

wherein the controller detects and corrects for an error in the second boot zone while executing the booting program in the first boot zone, when no error is detected in the first boot zone.

19. (PREVIOUSLY PRESENTED) A memory protection apparatus, including an ATAPI drive for storing an executable firmware program downloaded from a host, the apparatus comprising:

a first storage unit having a first boot zone storing a first booting program and a second boot zone storing a duplicate of the first booting program, as a second booting program;

a second storage unit storing the firmware program; and

a controller detecting for an error in one of the first and second boot zones when the ATAPI drive is initialized, executing the first booting program or the second booting program based on whether the one boot zone is the first boot zone or the second boot zone, and controlling execution of the firmware program stored in the data zone of the second storage unit,

wherein the controller detects and corrects for an error in the second boot zone while executing the booting program in the first boot zone, when no error is detected in the first boot zone,

wherein data in the first boot zone, which has no error, is used as a basis for the detection and correction of the error in the second boot zone.

20. (ORIGINAL) The apparatus of claim 17, wherein the controller corrects for an error in the first boot zone while executing the second booting program in the second boot zone, when the error is detected in the first boot zone.

21. (CURRENTLY AMENDED) A memory protection apparatus, including an ATAPI drive for storing an executable firmware program downloaded from a host, the apparatus comprising:

a first storage unit having a first boot zone storing a first booting program and a second boot zone storing a duplicate of the first booting program, as a second booting program;

a second storage unit storing the firmware program; and

a controller detecting for an error in one of the first and second boot zones when the ATAPI drive is initialized, commencing execution of the first booting program or the second booting program, respectively, based on respective error detection results of the first and second boot zones, and controlling execution of the firmware program stored in the data zone of the second storage unit
The apparatus of claim 20,

wherein the controller corrects for an error in the first boot zone while executing the second booting program in the second boot zone, when the error is detected in the first boot zone,

wherein data in the second boot zone, which has no error, is used as a basis for the correction of the error in the first boot zone.

22. (CURRENTLY AMENDED) A memory protection apparatus, including an ATAPI drive for storing an executable firmware program downloaded from a host, the apparatus comprising:

a first storage unit having a first boot zone storing a first booting program and a second boot zone storing a duplicate of the first booting program, as a second booting program;

a second storage unit storing the firmware program; and

a controller detecting for an error in one of the first and second boot zones when the ATAPI drive is initialized, executing the first booting program or the second booting program based on whether the one boot zone is the first boot zone or the second boot zone, and controlling execution of the firmware program stored in the data zone of the second storage unit,

wherein the controller further comprises a switching unit switching the second boot zone on, so as to jump to the second boot zone, during the initialization of the ATAPI drive, to execute the second booting program,

wherein the ATAPI drive is operable after selectable booting of the first and second booting programs and upon execution of the firmware program.

23. (ORIGINAL) The apparatus of claim 17, further comprising a computer, as the host, with the ATAPI drive and the computer communicating using an ATAPI protocol.

24. (CURRENTLY AMENDED) A method of operating an ATAPI drive, storing an executable firmware program downloaded from a host, the method comprising:

detecting for an error in first and second boot zones of a first storage unit when the ATAPI drive is initialized, the first boot zone storing a first booting program and the second boot zone storing a duplicate of the first booting program, as a second booting program;

commencing execution of the first booting program based on error detection results of the first boot zone;

commencing execution of the second booting program based upon an error being detected in the first boot zone and on error detection results of the second boot zone; and

accessing a data zone of a second storage unit, storing the firmware program, and executing the firmware program after the execution of the first or second booting programs,

wherein the ATAPI drive is operable after selectable booting of the first and second booting programs and upon execution of the firmware program.

25. (CURRENTLY AMENDED) A method of operating an ATAPI drive, storing an executable firmware program downloaded from a host, the method comprising:

detecting for an error in first and second boot zones of a first storage unit when the ATAPI drive is initialized, the first boot zone storing a first booting program and the second boot zone storing a duplicate of the first booting program, as a second booting program;

commencing execution of the first booting program based on error detection results of the first boot zone;

commencing execution of the second booting program based upon an error being detected in the first boot zone and on error detection results of the second boot zone; and

accessing a data zone of a second storage unit, storing the firmware program, and executing the firmware program after the execution of the first or second booting programs^{The method of claim 24,}

wherein during the executing of the first booting program, an error in the second boot zone is corrected for, while executing the first booting program, which has no error.

26. (PREVIOUSLY PRESENTED) A method of operating an ATAPI drive, storing an

executable firmware program downloaded from a host, the method comprising:

detecting for an error in first and second boot zones of a first storage unit when the ATAPI drive is initialized, the first boot zone storing a first booting program and the second boot zone storing a duplicate of the first booting program, as a second booting program;

executing one of the first and second booting programs based on whether the corresponding first or second boot zone has no error; and

accessing a data zone of a second storage unit, storing the firmware program, and executing the firmware program after the execution of the one booting program,

wherein during the executing of the one booting program, an error in the second boot zone is corrected for, while executing the first booting program, which has no error, and

wherein data in the first boot zone, which has no error, is used as a basis for the detection and correction of an error in the second boot zone.

27. (PREVIOUSLY PRESENTED) The method of claim 24, wherein during the executing of the second booting program, an error in the first boot area is corrected for, while executing the second booting program, which has no error.

28. (CURRENTLY AMENDED) A method of operating an ATAPI drive, storing an executable firmware program downloaded from a host, the method comprising:

detecting for an error in first and second boot zones of a first storage unit when the ATAPI drive is initialized, the first boot zone storing a first booting program and the second boot zone storing a duplicate of the first booting program, as a second booting program;

commencing execution of the first booting program based on error detection results of the first boot zone;

commencing execution of the second booting program based upon an error being detected in the first boot zone and on error detection results of the second boot zone; and

accessing a data zone of a second storage unit, storing the firmware program, and executing the firmware program after the execution of the first or second booting programs~~The method of claim 27,~~

wherein during the executing of the second booting program, an error in the first boot area is corrected for, while executing the second booting program, which has no error, and

wherein data in the second boot zone, which has no error, is used as a basis for the correction of the error in the first boot zone.

29. (ORIGINAL) The method of claim 24, wherein the host is a computer and the ATAPI drive and the computer communicate using an ATAPI protocol.

30. (CURRENTLY AMENDED) A storage system, comprising:
a first memory storing more than one booting program;
a second memory storing a firmware program for the storage system, separately addressable from the first memory; and
a controller checking for a presence of an error in a first memory portion, of the first memory, when a storage drive containing the first memory is initialized, commencing execution of a first booting program, stored in the first memory portion, upon no error being detected in the first memory portion, and commencing execution of a different booting program stored in a different memory portion of the first memory, upon the error being detected in the first memory portion, and executing the firmware program after executing a booting program,
wherein the storage system is operable after selectable booting of the first and second booting programs and upon execution of the firmware program.

31. (CURRENTLY AMENDED) A storage system, comprising:
a first memory storing more than one booting program;
a second memory storing a firmware program for the storage system, separately addressable from the first memory; and
a controller checking for a presence of an error in a first memory portion, of the first memory, when a storage drive containing the first memory is initialized, commencing execution of a first booting program, stored in the first memory portion, upon no error being detected in the first memory portion, and commencing execution of a different booting program stored in a different memory portion of the first memory, upon the error being detected in the first memory portion, and executing the firmware program after executing a booting program~~The storage system of claim 30,~~

wherein the first memory is divided into separately addressable memory portions, including the first memory portion, with at least two memory portions including booting programs.

32. (ORIGINAL) The storage system of claim 30, wherein the controller detects and corrects for an error in a second memory portion while executing the first booting program, when no error is detected in the first boot zone.

33. (PREVIOUSLY PRESENTED) A storage system, comprising:
a first memory storing more than one booting program;
a second memory storing a firmware program for the storage system, separately addressable from the first memory; and
a controller checking for a presence of an error in a first memory portion, of the first memory, when a storage drive containing the first memory is initialized, executing a first booting program, stored in the first memory portion, if no error is detected in the first memory portion, and executing a different booting program stored in a different memory portion of the first memory, if the error is detected in the first memory portion, and executing the firmware program after executing a booting program,

wherein the controller detects and corrects for an error in a second memory portion while executing the first booting program, when no error is detected in the first boot zone, and

wherein data stored in the first memory portion, which has no error, is used as a basis for the detection and correction of the error in the second memory portion.

34. (ORIGINAL) The storage system of claim 33, wherein a booting program of the second memory portion is replaced by the first booting program during the correction of the error in the second memory portion.

35. (ORIGINAL) The storage system of claim 30, wherein the controller detects and corrects for an error in the first memory portion while executing a second booting program from a second memory portion, when no error is detected in the second memory portion.

36. (ORIGINAL) The storage system of claim 35, wherein data stored in the second memory portion, which has no error, is used as a basis for the correction of the error in the first memory portion.

37. (CURRENTLY AMENDED) A storage system, comprising:
a first memory storing more than one booting program;
a second memory storing a firmware program for the storage system, separately addressable from the first memory; and
a controller checking for a presence of an error in a first memory portion, of the first memory, when a storage drive containing the first memory is initialized, commencing execution of a first booting program, stored in the first memory portion, upon no error being detected in the

first memory portion, and commencing execution of a different booting program stored in a different memory portion of the first memory, upon the error being detected in the first memory portion, and executing the firmware program after executing a booting program~~The storage system of claim 36,~~

wherein the controller detects and corrects for an error in the first memory portion while executing a second booting program from a second memory portion, when no error is detected in the second memory portion,

wherein data stored in the second memory portion, which has no error, is used as a basis for the correction of the error in the first memory portion, and

wherein the first booting program of the first memory portion is replaced by the second booting program during the correction of the error in the first memory portion.

38. (ORIGINAL) The storage system of claim 30, further comprising a host communicating to the second memory to store the firmware in the second memory.

39. (ORIGINAL) The storage system of claim 38, wherein the first and second memories are in an AT Attachment Packet Interface (ATAPI) drive and the host is a computer communicating with the ATAPI drive using an ATAPI protocol.